

What is claimed is:

1. A method of fabricating an inductor formed on a substrate having at least one first dielectric layer thereon, the method comprising:

5 forming a patterned first metal layer and a first inductor pattern within the first dielectric layer;

forming a patterned second dielectric layer on the first dielectric layer for covering the first metal layer, the first inductor pattern and the first dielectric layer, the second dielectric layer having pluralities of first openings and second openings, wherein the first openings expose the first metal layer and the second openings expose the first
10 inductor pattern;

filling a metal within the first openings and the second openings for forming a second metal layer within the first openings and a second inductor pattern within the second openings, wherein the second metal layer electrically connects with the first metal layer and the second inductor pattern electrically connects with the first inductor
15 pattern; and

forming a patterned third metal layer on the second metal layer and a third inductor pattern on the second inductor pattern, wherein the third metal layer electrically connects with the second metal layer, the third inductor pattern electrically connects with the second inductor pattern, and the first inductor pattern, the second
20 inductor pattern and the third inductor pattern have similar pattern.

2. The method of fabricating an inductor of claim 1, wherein the first metal layer comprises the upmost metal layer of a multi-layer interconnect on the substrate.

3. The method of fabricating an inductor of claim 1, wherein the second metal layer comprises metal plugs.

4. The method of fabricating an inductor of claim 1, wherein the third metal
5 layer comprises metal pads.

5. The method of fabricating an inductor of claim 1, wherein the inductor comprises a symmetric circular-spiral inductor or a concentric circular-spiral inductor.

10 6. The method of fabricating an inductor of claim 1, wherein the first inductor pattern, the second inductor pattern and the third inductor pattern constitute a three-dimensional inductor structure; the three-dimensional inductor structure has an overlapping area; at the overlapping area the first inductor pattern does not connect with the third inductor pattern via the second inductor pattern for making a current only
15 flowing along the first inductor pattern when the current first time flows through the overlapping area and the current only flowing along the third inductor pattern when the current second time flows through the overlapping area.

7. An inductor formed on a substrate having at least one dielectric layer thereon,
20 comprising:

a first inductor pattern formed within the dielectric layer;

a second inductor pattern formed on the first inductor pattern and electrically connecting therewith; and

a third inductor pattern formed on the second inductor pattern and electrically connecting therewith, wherein the first inductor pattern, the second inductor pattern and the third inductor pattern have similar pattern.

5 8. The inductor of claim 7, wherein the first inductor pattern and a patterned first metal layer formed on the substrate are on the same layer and the first metal layer comprises the upmost metal layer of a multi-layer interconnect structure formed on the substrate.

10 9. The inductor of claim 7, wherein the second inductor pattern and a patterned second metal layer formed on the substrate are on the same layer, and the second metal layer comprises metal plugs.

15 10. The inductor of claim 7, wherein the third inductor pattern and a patterned third metal layer formed on the substrate are on the same layer, and the third metal layer comprises metal pads.

20 11. The inductor of claim 7, wherein the inductor comprises symmetric circular-spiral inductor or a concentric circular-spiral inductor.

12. The inductor of claim 7, wherein the first inductor pattern, the second inductor pattern and the third inductor pattern constitute a three-dimensional inductor structure; the three-dimensional inductor structure has an overlapping area; at the overlapping area the first inductor pattern does not connect with the third inductor

pattern via the second inductor pattern for making a current only flowing along the first inductor pattern when the current first time flows through the overlapping area and the current only flowing along the third inductor pattern when the current second time flows through the overlapping area.

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13. A method of fabricating an inductor formed on a substrate having at least one first dielectric layer thereon, comprising:

forming a patterned first metal layer and a first inductor pattern within the first dielectric layer;

10 forming a patterned second dielectric layer on the first dielectric layer for covering the first metal layer, the first inductor pattern and the first dielectric layer, the second dielectric layer having pluralities of first openings and second openings, wherein the first openings expose the first metal layer and the second openings expose the first inductor pattern; and

15 forming a second metal layer filling the first openings and on the second dielectric layer and forming a second inductor pattern filling the second openings and on the second dielectric layer, wherein the second metal layer electrically connects with the first metal layer and the second inductor pattern electrically connects with the first inductor pattern.

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14. The method of fabricating an inductor of claim 13, wherein the first metal layer comprises the upmost metal layer of a multi-layer interconnect on the substrate.

15. The method of fabricating an inductor of claim 13, wherein the second metal layer comprises metal plugs and metal pads.

16. The method of fabricating an inductor of claim 15, wherein the second metal
5 layer and the second inductor pattern comprise aluminum.

17. The method of fabricating an inductor of claim 13, wherein the inductor comprises symmetric circular-spiral inductor or a concentric circular-spiral inductor.

10 18. The method of fabricating an inductor of claim 13, wherein the first inductor pattern, the second inductor pattern and the third inductor pattern constitute a three-dimensional inductor structure; the three-dimensional inductor structure has an overlapping area; at the overlapping area the first inductor pattern does not connect with the third inductor pattern via the second inductor pattern for making a current only
15 flowing along the first inductor pattern when the current first time flows through the overlapping area and the current only flowing along the third inductor pattern when the current second time flows through the overlapping area.